this year in Washington shortly after 3 p. m. an unusually severe thunderstorm caused the daylight intensity to fall rapidly to something like a foot-candle, and the resulting sudden increase in load was probably one of the factors that put the Electric Power plant temporarily out of commission. The darkness lasted for about an hour. Figure 4, which was prepared by Mr. Smirnoff, enables us to compare the intensity of solar and sky radiation on this day, and also on July 29, 1921, with the electric lighting load. It will be noted that whenever the radiation intensity fell to about six units on the vertical scale of the record, or about 0.25 gram-calories per minute per square centimeter, =1,500 foot-candles of illumination, the electric lighting load always increased, on account of more lights being used.

Acknowledgment is made of our indebtedness to Prof. Henry J. Cox, in charge of the local office of the Weather Bureau at Chicago, Ill., and to the members of his office force, for assistance given in connection with the observational work at Chicago. Especial mention should be made of Mr. Paul E. Johnson, who made many of the readings at the University of Chicago, and Mr. William L. Maloney, who made a part of the readings on the dome of the Federal Building. Observational work at the latter point was carried on under adverse conditions; without the hearty cooperation of Prof. Cox and his assistants, it would have been impossible.

SUMMARY.

From measurements of sky brightness that have been made at Washington and Chicago, charts have been prepared showing the brightness of the sky under different conditions of cloudiness and with the sun at different altitudes.

On these charts the sky has been divided into 10-degree zones concentric about the zenith, or about selected points on the horizon, and the brightness of these zones determined for typical sky conditions.

It is shown that with these data it becomes possible to compute the illumination resulting from the sky brightness on a horizontal surface and on vertical surfaces facing the selected points on the horizon.

A method is also given for taking account of the shading effect of buildings and other objects. This makes it possible to compute for average sky conditions of the various types the illumination that results from exposure to any given portion of the sky at any hour of the day or season of the year. The standard deviation and the extreme deviations from these mean values may also be given.

While each case becomes a separate and distinct problem, it is believed that for the more important industrial centers tables may be prepared covering a majority of cases that will arise, and perhaps differentiating between good and bad illumination.

UNIVERSITY COOPERATION IN SKY BRIGHTNESS MEASUREMENTS.

In the discussion of the report of the Committee on Sky Brightness of the Illuminating Engineering Society at the recent convention in Rochester, N. Y., it was suggested that the universities might cooperate in this work by assigning it as the subject of a thesis for an advanced student.

The Weather Bureau would welcome such cooperation, and suggests that universities wishing to undertake this work correspond with Dr. H. H. Kimball, Weather Bureau, Washington, D. C., Chairman of the Committee on Sky Brightness, I. E. S.

It seems desirable that work along this line if undertaken by different individuals or institutions should be coordinated, so that measurements made in different localities may be comparable, and also to avoid unnecessary duplication.—*H. H. K.*

COMPARISON OF DIFFUSE AND DIRECT SOLAR RADIATION.[1]

551.52(048)

By J. VALLOT.

[Reprinted from *Science Abstracts*, Aug. 31, 1921, p. 548, § 1384.]

Employing Arago and Michelson actinometers, the latter for direct solar radiation, determinations were made at Nice, hourly from 8h. to 16h. on 30 clear days distributed throughout the year, of I_s, the intensity of direct solar radiation, I_t, the total radiation, and $I_{t'}$, the total radiation diminished by I_R; where I_R is the amount reflected from the earth's surface. From these are deduced $I_d = I_t - I_s$, $I_r = I_t - I_{t'}$, and $I_c = I_{t'} - I_s = I_d - I_r$. The diurnal and seasonal variation of all these quantities and of the ratios I_t/I_s, I_d/I_s, I_c/I_s, and I_r/I_t are exhibited in tabular form. The last ratio is found to increase slightly with the height of the sun, but never to reach the value 0.1. The chief result is, however, the considerable magnitude of the ratios I_d/I_s and I_c/I_s. On clear days the former is on an average as large as 0.33, and the latter 0.23. On cloudy days these ratios would of course be greater.—*M. A. G.*

[1] *Comptes Rendus*, May 9, 1921, 172: 1164–1167.

EQUIVALENT RADIATIVE TEMPERATURE OF THE NIGHT SKY.[1]

551.52:551.524
(048)

By W. H. DINES.

[Reprinted from *Science Abstracts*, 1921, 24: 216a.]

Observations taken intermittently from September 1919 to February 1920 have given equivalent radiative temperatures of the zenith sky ranging from 180° to 280° abs., the lower values being confined to winter. Some later observations in June gave values about 264° abs. on clear nights. The seasonal range is certainly much greater than that of the actual air temperature, which is about 10° C. On heavily clouded nights the sky temperature differs little from the surface air temperature. Wind appears to make no difference to the radiation. It is estimated that on clear nights the average rate of net radiation from the earth (for the whole hemisphere) is about 150 gm. cals. per day, though the rate may reach 250 gm. cals. per day.

As regards radiation at various zenith distances, the approximate relative values of the net radiation, 100 denoting the net radiation to the zenith, found for clear nights in the last fortnight of May, were:

Altitude	90°	75°	60°	45°	30°	15°	0°
Radiation	100	99	96	89	73	43	0

—*M. A. G.*

[1] *Jour. Roy. Met'l Soc.*, London, Oct., 1920, 46: 406.